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| EXAMINER | |
|---|---|
| NELSON, ALECIA DIANE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2675 | |

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/007,118 | DALY, SCOTT J. | |
| | Examiner | Art Unit | |
| | Alecia D. Nelson | 2675 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-14 and 19-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 19-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. ***Claims 1- 7, 13, 14, and 19-25*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuller (U.S. Patent Application Publication No. 2002/0171617) in view of Sakaguchi et al. (U.S. Patent No. 6,448,951).

As pertaining to **claims 1, 19, and 21**, Fuller teaches the method of illuminating a backlit display (130) by varying a luminance of a light source (124) illuminating a plurality of displayed pixels in response to a plurality of intensity values of said pixels (see paragraphs (18, 34, and 39) and varying the transmittance of a light valve (112) of the display in a non-binary manner (see paragraphs 38-39).

While Fuller teaches that the backlight is capable of being operated at varied intensities, and also states that the intensity of the light transmitted to each color filter element is determined by the liquid crystal element and the active element associated with that color filter element (see paragraph 39), there fails to be specific disclosure that the backlight is spatially varied.

Sakaguchi et al. teaches a liquid crystal display device comprising a backlight device (4), which is divided into N backlight sections (see Figure 4) generating red,

green, or blue light within an area of the display associated with the backlight sections (see abstract). The ON/OFF states of the individual backlight sections are independently controlled by the backlight driver (8) (see column 5, lines 45-56). With further reference to Figure 4, which describes the relationship between the backlight sections and the three areas (3A-c) in the LCD. The backlight sections (0-2) are assigned for the first area (3A), the backlight sections (3-5) are assigned for the second area (3B), and the backlight sections (6-8) are assigned the third area (3C). The backlight driver (8) selectively activates one of the R, G, and B LEDs (see column 6, lines 52-65). The LCD controller (7) and the backlight driver (8) control the backlight sections (0-8), so that when either R, G, or B data are written to one of the sub-areas, the backlight section assigned for the sub-area is turned on to generate a light having the same color as the color data (see column 8, lines 63-66).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow spatially varying the luminance of the backlight illuminating a plurality of displayed pixels as taught by Sakaguchi et al, in a device similar to that which is taught by Fuller in order to provide a LCD device wherein the backlight intensity is controlled in response to the pixel intensity thereby lowering the usage of the backlight intensity, which in turns enables efficient power savings and produces better color of the displayed image.

As pertaining to **claim 2**, Fuller teaches a) determining a luminance of said pixel from said intensity value and b) varying a luminance of said light source according to a

relationship of said luminance of said pixel and said luminance of said light source (paragraphs: 39). **Claim 2** is dependent on **claim 1** and is rejected on the same basis and what is stated above.

As pertaining to **claims 3, 5, and 7**, Fuller teaches all that is required as explained above with reference to **claim 1**. While Fuller fails to specifically teach the nonlinear relationship between the luminance of the pixel and the luminance of the light source it is taught that the luminance of the pixel and the light source are determined independently of one another. Wherein the transmitted video signal controls the active element (pixel) by controlling the alignment of the liquid crystal molecules of the cell and as a result the transmittance of the liquid crystal element of the cell. The video signal controls the proportion of the received backlight signal that the cell internally transmit to its color filter element.(see paragraphs 34, 38, 41, and 44).

Therefore it would have been obvious to allow for a nonlinear relationship between the pixel and the light source as suggest by and carried out in the device of Fuller in order to provide a system wherein the backlight control signal and the video signal are determined for a given frame to be displayed by the display arrangement. This allows for modulating and more precisely lowering the backlight signal, through the modulation of the backlight control signal (see paragraph 18).

As pertaining to **claim 4,** Fuller teaches wherein the step of determining a luminance of a pixel from an intensity value comprises the step of filtering an intensity

value for a plurality of pixels (see paragraph 71). **Claim 4** is dependent on **claims 1-2** and is rejected on the same basis and what is stated above.

As pertaining to **claim 6,** Fuller teaches the step of sampling a filtered intensity value at a spatial coordinate (each active cell) to the light source (see paragraphs 37-39).. **Claim 6** is dependent on **claims 1-2 and 4** and is rejected on the same basis and what is stated above.

As pertaining to **claim 13,** Fuller teaches the step of varying a luminance of a plurality of light sources illuminating a plurality of displayed pixels substantially comprising a frame in a sequence of video frame (paragraphs: 13-19). **Claim 13** is dependent on **claim 1** and is rejected on the same basis and what is stated above.

As pertaining to **claim 14,** Fuller teaches a frame in sequence of video frames comprises the step of varying said luminance of said light sources for less than all frames of said sequence (paragraphs: 58-63 figs. 5-6). **Claim 14** is dependent on **claims 1 and 13** and is rejected on the same basis and what is stated above.

As pertaining to **claim 20,** Fuller teaches a video controller (800) that receives and processes the initial video signal to generate and transmit the adjusted video signal to the cells. The video controller also allows generating the backlight signal (see paragraph 64). Further it would be an inherent feature to allow some type of device, i.e., data processing unit or image processor or generator or controller etc., would have

the capabilities to provide how much power is needed to drive each light source in order to display the luminance of pixels because it has the "information" or "instructions" regarding the image to be displayed, furthermore, it would be obvious that the light element or light source driver would provide power to the light source elements. **Claim 20** is dependent on **claim 19** and is rejected on the same basis and what is stated above.

As pertaining to **claim 22,** the light source driver controlling said luminance level of light output by said at least one light source according to a relationship of said luminance level of said output light and a data value for a display pixel (paragraphs: 43-57; 64). **Claim 22** is dependent on **claim 21** and is rejected on the same basis and what is stated above.

As pertaining to **claim 23**, Fuller teaches that the backlight (124) may be comprised of an arrangement of red, green, and blue LEDs (see paragraph 34).

As pertaining to **claims 24 and 25**, while Fuller teaches that the light source includes a plurality of light emitting diodes, there fails to be discussion of each of the LEDs being associated with a different pixel.

Sakaguchi et al. teaches in Figures 8-10 that the light emitting diodes are associated with a different pixel. With further reference to claim 25, Sakaguchi et al.

teaches that the backlight sections are independently controlled (see column 5, lines 49-50), therefore the LEDs receive different intensity values.

Therefore it would have been obvious to one having ordinary skill in the art to allow the usage of the independently controlled backlight sections including a plurality of LEDs associated with a different pixel, as taught by Sakaguchi, in a device similar to that which is taught by Fuller in order to there provide an image with improved color.

3. ***Claim 8*** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuller in view of Sakaguchi et al. as applied to **claim 1** above, and further in view of Kabel et al. (hereinafter "Kabel"), US 6,590,561 B1.

As pertaining to **claim 8,** Fuller and Sakaguchi et al. discloses what has previously been stated above. However fails to disclose that the light source operates at a substantially maximum luminance if the luminance of at least one displayed pixel exceeds a threshold luminance.

As pertaining to **claim 8,** Kabel discloses a method in which a dimming operation occurs in which if it exceeds a threshold it, the light source, will not turn off. The flow chart of fig. 2 follows: The dimming routine begins when the controller 22 senses a request to dim the display module 16 as depicted in step 200 of FIG. 2. For example, an operator wishing to dim an image may press a down arrow or operate a slide bar on the user interface 24. The controller 22 then determines if the lowest threshold of the backlight 12 or a pre-selected threshold level has been reached as depicted in step 202. The lowest threshold of the back light 12 is pre-selected and may be any percentage of

the full brightness of the back light 12. For example, through experimentation, it may be determined that the backlight 12 ceases to emit appreciable light at a power level of 25°/a. This 25°/a level may then be preset as the lowest threshold for the back light 12. If the lowest threshold of the back light 12 has not been reached, the program proceeds to step 204 where the controller 22 dims the back light 12 the amount requested by the user interface 24 to reduce the amount of light passing through the display module 16. The routine then starts over to await further requests to dim the display module 16. If the controller 22 determines that the lowest or pre-selected threshold of the back light 12 has been reached in step 202, the routine proceeds to step 206 where the controller 22 determines whether the lowest threshold of the pixels has been reached. The lowest threshold for the pixels may be pre-selected and may be any percentage of the normal voltage levels for the pixels. For example, it may be determined that the pixels fail to operate properly if their voltage level is reduced by more than 75%. If so, 25% of the pixels' normal operating voltage maybe preset as the lowest threshold for the pixels. If the lowest threshold for the pixels has been reached, the routine ceases dimming the display module 16. If, however, the lowest threshold for the pixels has not been reached in step 206, the routine proceeds to step 208 where the controller 22 proportionally adjusts the voltage level of all active pixels. The user interface 24 and the controller 22 may be configured to reduce the voltage levels delivered to the pixels in discrete steps or may provide an analog, infinite amount of reduction levels. It would be obvious that if this method can be used for dimming it further can used to brighten a display.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Kabel with that of Fuller and Sakaguchi et al..

The suggestion/motivation for doing so would have been to provide for a display that can operate at full on luminance and intensity when desired and when not. This allows for a user to see, as if, the display is at a better resolution, better contrast etc. (see column 1, line 38-column 2, line14). Again, Kabel operates for dimming the display but it would be obvious that it can operate in the opposite direction and be used for brightening a display. **Claim 8** is dependent on **claims 1-2** and is rejected on the same basis and what is stated above.

4. ***Claims 9-12*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuller in view of Sakaguchi et al. and Kabel as applied to **claims 1 or 2 or 8** above, and further in view of Lim et al. (hereinafter "Lim"), US 2003/0057253 A1.

As pertaining to **claim 9**, Fuller and Kabel disclose what has previously been stated above, however fails to disclose the step of attenuating the light source according to the relationship of said luminance of light source and a mean luminance of pixels.

As pertaining to **claim 9**, Lim discloses the attenuating the light source according to the relationship of said luminance of light source and a mean luminance of pixels (paragraphs: 0024, 0047 and abstract).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of attenuating of Lim with that of Fuller, Sakaguchi et al., and Kabel.

The suggestion/motivation for doing so would have been to provide for better display that will have a different way of illuminating itself. This will allow for higher contrast and resolution and further improve the dynamic range. **Claim 9** is dependent on **claims 1-2 and 8** and is rejected on the same basis and what is stated above.

As pertaining to **claim 10,** Fuller teaches the step of varying a luminance of a plurality of light sources illuminating a plurality of displayed pixels substantially comprising a frame in a sequence of video frame (paragraphs: 13-19). **Claim 13** is dependent on **claim 1** and is rejected on the same basis and what is stated above.

As pertaining to **claim 11,** Fuller teaches a frame in sequence of video frames comprises the step of varying said luminance of said light sources for less than all frames of said sequence (paragraphs: 58-63 figs. 5-6). **Claim 14** is dependent on **claims 1 and 13** and is rejected on the same basis and what is stated above.

As pertaining to **claim 12**, Fuller teaches that the plurality of pixels comprises at least two contiguous pixels (figs. 5-6) **Claim 12** is dependent on **claims 1-2 and 8-9** and is rejected on the same basis and what is stated above.

***Response to Arguments***

5. Applicant's arguments with respect to ***claims 1-14 and 19-25*** have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alecia D. Nelson whose telephone number is (703) 305-0143. The examiner can normally be reached on Monday-Friday 9:30-6:00. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

adn/AND
September 17, 2004

AMR A. AWAD
PRIMARY EXAMINER